XI-12

State of New Mexico
ENVIRONMENT DEPARTMENT
Office of the Secretary
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502-6110
Telephone: (505) 827-2855
Fax: (505) 827-2836

BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

DERRITH WATCHMAN-MOORE
DEPUTY SECRETARY

August 3, 2006

Mr. Wayne Nastri, Regional Administrator
USEPA Region 9
75 Hawthorn Street
San Francisco, CA 94105

Dear Mr. Nastri:

This letter is in reference to the USEPA Region 9 release of a draft air quality permit for the Desert Rock Energy Center. It is my understanding that the comment period for this draft permit will close on October 27, 2006. In the meantime, USEPA Region 9 is coordinating a series of public workshops that will culminate in a public hearing later this fall. The Desert Rock Energy Center proposal is for a 1500 MW power plant; the emissions from such a plant will not be trivial, even with incorporation of the best available control technologies at the facility. As with any industrial development, the impacts to public health and the environment will be significant. This project is proposed for an area of northwestern New Mexico where oil and gas exploration and development is already underway and rapidly expanding. There are also two older power plants in this area that are among the highest emitting power plants in the country. As recently as a couple of weeks ago, air quality monitors in northwestern measured concentrations of ozone that approach the federal ambient air quality standard.

In light of the environmental issues already present in northwestern New Mexico and the largely rural populations that would be impacted by the Desert Rock Energy Center, I would encourage USEPA Region 9 to be as inclusive as possible in engaging the public to comment on the draft air quality permit. The public workshops should be translated to tribal languages to encourage broad participation in these events. Public workshops should be readily accessible to all residents of the area. Due to the large geographic area that the plant may impact, I would suggest several public hearings to allow residents of the area the convenience of short travel times to present testimony.

I appreciate USEPA's hard work in handling this complex permitting action. It is now important that the public have a voice in the final permitting action so that the air quality permit considers the needs of the communities that will be most affected by the action.

Sincerely,

Ron Curry
Secretary

XI-13

State of New Mexico
ENVIRONMENT DEPARTMENT
Environmental Protection Division
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502-6110
Telephone (505) 827-2932
Fax (505) 827-0310
www.nmenv.state.nm.us

BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

JIM NORTON
DIRECTOR

October 12, 2006

Robert Baker, Air-3
U.S. Environmental Protection Agency, Region 9
75 Hawthorne St.
San Francisco, CA 94105

RE: Desert Rock Energy Facility Proposed Air Permit

Dear Mr. Baker,

The New Mexico Environment Department (NMED) reviewed the draft Prevention of Significant Deterioration (PSD) permit for the Sithe Global Power, LLC (Sithe) Desert Rock Energy Facility (Desert Rock). The following comments from NMED focus on two serious technical flaws in the proposed permit. The Desert Rock Energy Facility's emissions will significantly impact New Mexico's air quality. NMED appreciates your consideration of our comments before finalizing the permit.

The first serious flaw is that EPA Region 9 incorrectly rejected integrated gasification combined cycle (IGCC) as a viable air pollution control technology method for a coal-fired power plant. A few years ago, EPA ruled Sithe's permit application for the Desert Rock Energy Facility "complete" despite the application's deficient best available control technology (BACT) analysis. As stated in NMED's October 8, 2004 letter to USEPA Region 9, the permit application was deficient because of Sithe's failure to evaluate IGCC combustion systems in the BACT analysis. Subsequently, IGCC was included in the analysis, but rejected by USEPA Region 9 in the analysis of the application because the inclusion of IGCC would "redefine the source". This determination by EPA Region 9 conforms with EPA's December 2005 letter to E3 Consulting stating that IGCC need not be part of the BACT analysis for a supercritical pulverized coal unit because it would "redefine the source". NMED disagrees with this decision. The Congressional record is clear that Congress intended to require the consideration of innovative fuel combustion techniques like IGCC during the BACT analysis. The IGCC technology is currently available and technologically feasible as evidenced in part by the proposed construction of numerous plants around the country including the recent Xcel Energy announcement proposing a new 300-350 MW IGCC electrical generating facility in Colorado. Since the IGCC technology was not considered in EPA Region 9's top down BACT analysis, it will never be known whether IGCC is BACT for Desert Rock or not.

The Clean Air Act requires the assessment of "impacts other than impacts on air quality standards due to emissions of the regulated pollutant in question, such as solid or hazardous waste generation, discharges of polluted water from a control device, visibility impact, or emissions of unregulated pollutants" in the BACT analysis. EPA failed to consider carbon dioxide emissions from Desert Rock in the BACT analysis. Although carbon dioxide emissions are currently unregulated, the impacts of these emissions are significant and result in undesirable impacts to our state, nation and world. Governor Richardson has established state-wide greenhouse gas emission reduction goals. The emissions from Desert Rock as proposed will require more reductions from other sectors of industry and the public to meet the New Mexico goals. NMED strongly urges EPA to consider the impacts of carbon dioxide emissions and available control technologies for these emissions in issuing a final air quality permit.

The second serious flaw in the proposed permit is the omission of any permit conditions relating to mitigation measures for adverse visibility and deposition impacts at Class I and Class II areas in the southwest due to the proposed construction. During the permit application review process, the federal land managers identified potentially adverse impacts that could occur with the construction of the Desert Rock Energy Facility. The federal land managers worked with Sithe, EPA and the Navajo Nation to develop a mitigation plan so that an adverse impact determination would not be made. In fact, Sithe proposed a mitigation strategy that would effectively offset impacts to visibility and deposition. The federal land managers have agreed that the strategy would eliminate the necessity of an adverse impact determination. NMED concurs with the agreement and believes that it is necessary for the plan to be implemented in order for the state to reach its reasonable progress goals under the regional haze rules and generally protect the pristine nature of our state and region's national parks and wilderness areas. This strategy, however, must be made federally enforceable through inclusion of related conditions in the final air quality permit for Desert Rock. Unfortunately, the draft permit fails to include any conditions related to the mitigation plan that was negotiated over a period of two years. The rationale behind the lack of inclusion by EPA Region 9 is unclear; however, the end result is that there is no assurance that the plan will be completed as agreed upon without enforceability through permit conditions. Must the permitting authority have an adverse impact determination to include enforceable conditions in a permit related to visibility and deposition in the permit? This policy would seem to discourage resolution of issues prior to permit issuance and encourage resolution through more formal processes. NMED has found that dispute resolution early in the permitting process results in a much less complicated and open permitting process where the public participation is more easily facilitated and meaningful. NMED urges EPA Region 9 to include enforceable conditions related to the Sithe mitigation plan in the final air quality permit.

In November 2005, a Memorandum of Understanding was signed by several governmental agencies, laying the ground work for a Task Force on Air Quality and Visibility to address air quality issues in the Four Corners Region. Air quality in the region is very close to exceeding the 8-hour ozone national ambient air quality standard. An EIS analysis of visibility impairment due to proposed oil and gas exploration in the Four Corners region showed that it may be difficult for states in the area to meet the reasonable progress goals of the federal regional haze rule in the future. The Task Force is in the process of working over a two year period making its final report available by December 2007. The mitigation options in the final Task Force Report will be seriously considered by the air quality regulating agencies, who will decide which options to recommend for implementation. By creating a

uniform approach to mitigating air quality impacts for a regional area, the issues of state, tribal, and federal boundaries will be opened up to creating more of a one air basin approach to dealing with air pollution. Air quality in the region is already seriously compromised. The proposed Desert Rock facility will be adding to this existing problem.

In conclusion, NMED has serious concerns about the draft permit for the Desert Rock Energy Facility, particularly the deficiencies of the BACT analysis and the lack of enforceable conditions to address adverse visibility and deposition impacts. The emissions from Desert Rock could adversely affect much of the state and Four Corners region. A comprehensive and technically sound permitting process for this facility is essential to preserving and protecting New Mexico's scenic vistas, parks and wilderness areas. We appreciate your consideration of our comments as you finalize this air quality permit.

Sincerely,

Jim Norton
Director, Environmental Protection Division

cc: Mary Uhl, Chief, Air Quality Bureau

Bob -

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GOVERNOR
Bill Richardson

DIRECTOR AND SECRETARY
TO THE COMMISSION
Bruce C. Thompson, Ph.D.

Tod Stevenson, Deputy Director

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

One Wildlife Way
Post Office Box 25112
Santa Fe, NM 87504
Phone: (505) 476-8008
Fax: (505) 476-8128

Visit our website at www.wildlife.state.nm.us
For basic information or to order free publications: 1-800-862-9310.

August 11, 2006

Gerardo Rios
US Environmental Protection Agency, Region IX
75 Hawthorne St.
San Francisco, CA 94105

Re: Clean Air Act permit for the proposed Desert Rock power plant
NMGF Doc. No. 11005

Dear Mr. Rios,

The New Mexico Department of Game and Fish (Department) has reviewed this project. It appears that the entire project area is on the property of the Navajo Reservation. The Department has no jurisdiction or authority for the wildlife resources on Indian reservations or property.

We would recommend that you contact the Navajo Reservation regarding general wildlife issues they may have and the U.S. Fish and Wildlife Service regarding any threatened or endangered species issues.

Thank you for the opportunity to review and comment on your project. If you have any questions, I can be contacted at (505) 476-8101 or janell.ward@state.nm.us.

Sincerely,

Janell Ward

Janell Ward, Assistant Chief, CSD
Conservation Services Division Chief

JWttd

xc: Russ Holder, Acting Ecological Services Field Supervisor, USFWS
Brian Gleadle, NW Area Operations Chief, NMGF
Mark Olson, NW Area Habitat Specialist, NMGF

Comment 15

November 10, 2006

VIA U.S. MAIL, FACSIMILE, AND ELECTRONIC MAIL

Mr. Robert Baker (AIR-3)
EPA Region IX
75 Hawthorne Street
San Francisco, CA 94105
e-mail: desertrockairpermit@epa.gov
facsimile: 415 947-3579

Comments on EPA's Proposed Construction Permit for the Desert Rock Energy Facility

Dear Mr. Baker:

Sierra Club and Phyllis Fox respectfully submit the following comments on the EPA's proposed permit to be issued to Sithe Global Power (Sithe) to construct the Desert Rock Energy Facility (DREF) on Navajo Nation lands. A compact disc containing supporting materials referred to herein is enclosed.

I. THE PERMIT'S EMISSIONS LIMITS DO NOT MEET "BEST AVAILABLE CONTROL TECHNOLOGY" STANDARDS

The Clean Air Act and its implementing regulations require the Permit to include emission limits consistent with the "best available control technology" for each pollutant subject to regulation under the Act. 42 U.S.C. § 7475(a)(4). The emission limits proposed for the pulverized coal-fired boilers ("PC boilers"), fuel-oil-fired sources, and material handling sources do not satisfy BACT. As discussed below, the BACT determinations for all of these pollutants suffer from the same fundamental flaw, failure to set a BACT limit based on the maximum degree of reduction that is achievable. In addition, the particular BACT limits for each of these pollutants suffer from a variety of additional errors, also discussed below.

I.A BACT Is The Lowest Limit That Is Achievable

The term "best available control technology" means "an emission limitation based on the maximum degree of reduction of each pollutant...." 40 CFR 52.21 (b)(12).

A BACT limit must represent the lowest limit "*achievable*" for the source—not the lowest limit previously *achieved* by sources in the past. 40 CFR 52.21 (b)(12) (emphasis added). This forward-looking emphasis is the "most important" mechanism promoting the Clean Air Act's "philosophy of encouragement of technology development." S. Rep. No. 95-127 at 18.

See also Alabama Power v. Costle, 636 F.2d 323, 372 (D.C. Cir. 1980) (noting that Prevention of Significant Deterioration Program is intended to be "technology forcing"). The BACT standard is intended to require use of "the latest technological developments [in pollution control] as a requirement in granting the permit," so as to "lead to rapid adoption of improvements in technology as new sources are built," rather than "the stagnation that occurs when everyone works against a single national standard for new sources." S. Rep. No. 95-127 at 18.

The BACT analyses for all pollutants rely on emission levels that have been permitted in the past or demonstrated in the past at other sources. The record we reviewed contains no evidence that an analysis was conducted to determine emission levels that are "achievable" with the selected BACT technology, as opposed to achieved. Ap.,[1] Sec. IV and Statement of Basis (SOB),[2] Sec. IV. The applicant and the EPA should have collected and evaluated test data reported to the EPA under various regulatory programs, discussed technology performance and guarantees with vendors, and then made an engineering judgment based on physical and chemical principles using this data as to what limits are "achievable" for Desert Rock to fulfill the technology forcing nature of BACT. The limits in permits for plants built in the past or permitted in the past serve only as the starting point for the BACT analysis of what is achievable for a plant to be built in the future. Those limits cannot also be the end of the BACT analysis; limits achieved in the past are a floor, not the ceiling for the BACT determination of what is "achievable" for a new source.

I.B BACT Limits Must Be Based on Maximum Degree Of Reduction

The term "best available control technology" means "an emission limitation based on the maximum degree of reduction of each pollutant..." 40 CFR 52.21 (b)(12). The degree of reduction means the amount by which a pollutant concentration is reduced, relative to the uncontrolled level. The degree of reduction information is used in step 3 of the top-down process to rank emissions from the lowest to the highest. NSR Manual, p. B.25 and Tables B-2 and B-3. The degree of reduction is calculated from design parameters and performance data for pollution control systems.

The control efficiency must be determined first so that the control options can be ranked and the top option selected. You cannot determine whether a given emission limit corresponds to the maximum degree of reduction without first determining what that reduction is and how it compares with reductions achievable by other methods and combinations of methods.

The Application and SOB do not include any performance data or degree of reduction data, required to prepare step 3 rankings, for any pollutant. Such data would include parameters such as design boiler outlet PM, PM10, NOx, SO2 and SAM; fabric filter, SCR, and FGD design control efficiency for each pollutant affected by these controls (NOx, SO2, SAM, fluorides, PM,

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[1] ENSR Corp., Application for Prevention of Significant Deterioration Permit for the Desert Rock Energy Facility, Prepared for Steag Power, LLC, May 2004.

[2] The term, "SOB" or statement of basis, is used throughout to refer to EPA's "Ambient Air Quality Impact Report" or AAQIR, which serves as the statement of basis and fact sheet required by 40 CFR 124.7. SOB, p. 1.

PM10), and the content of lead and fluorides in the coal. All of this data is required to determine the degree of reduction the chosen technologies would achieve at Desert Rock.

I.C BACT Is Not Required For NOx Emissions From PC Boilers

The applicant proposed a NOx BACT emission limit of 0.06 lb/MMBtu based on a 24-hour average in its May 2005 Application. Ap., p. 4-9. The EPA independently evaluated the applicant's analysis, performed additional analysis, and concluded that the proposed limit is lower than "any other reported BACT emission limit." Thus, EPA proposed BACT for NOx as an emission limit of 0.06 lb/MMBtu based on a 24-hr average." SOB, pp. 12-14.

The Draft Permit contains the proposed BACT limit of 0.06 lb/MMBtu. Permit, p. 5, Condition IX.E. The proposed NOx limit is not BACT because lower limits have been permitted and are achievable and it excludes periods of startup and shutdown, as set out below. Further, the subject BACT analysis did not follow the top-down process as set out in the NSR Manual and did not adhere to the statutory and regulatory definition BACT as noted above. These issues are discussed below. Further, EPA's characterization of some prior permitting decisions is incorrect.[3]

I.C.1 Lower NOx Limits

The EPA asserts that the proposed NOx BACT limit of 0.06 lb/MMBtu based on a 24 hour average "is lower than other NOx rates that have been proposed for or achieved by pulverized coal fired boilers recently." SOB, pp. 12-13. This is not correct.

I.C.1.a Other Permits

The Permit issued to Louisville Gas & Electric for its Trimble Unit 2 facility contains a NOx limit equivalent to 0.05 lb/MMBtu based on a 24-hour average. Ex. 1. Several vendors offered to guarantee the NOx emissions from this facility at 0.03 to 0.04 lb/MMBtu. Ex. 2. This is the lowest permitted NOx limit that we are aware of. This facility is under construction.

Trimble Unit 2 is a 750 MW supercritical boiler fired on high sulfur bituminous coal from Kentucky. The boiler is the same type as proposed for Desert Rock. The coal represents a worst-case for Desert Rock because Trimble will fire high sulfur bituminous coal, which generates higher boiler outlet NOx. Meeting this lower NOx limit at Trimble Unit 2 requires a higher overall NOx efficiency, achieved with more efficient low NOx burners and a better performing SCR than proposed for Desert Rock. It is a straightforward engineering extrapolation to conclude that Desert Rock could meet the Trimble limit at less cost and with less efficient equipment. Thus, Trimble establishes the BACT floor for Desert Rock.

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[3] The NOx limit for Thoroughbred and Prairie State are incorrect. SOB, p. 13. The Thoroughbred NOx BACT limit is 0.07 lb/MMBtu, based on a remand from the Cabinet Secretary. The Prairie State NOx limit is also 0.07 lb/MMBtu. The Longleaf SO_2 limit (0.12 lb/MMBtu) is also inconsistent with the SO_2 limits in the draft Permit, which range from 0.065 to 0.105 lb/MMBtu on a 30-day rolling average, depending on the sulfur content of the coal. SOB, p. 18.

We note that the final Trimble permit was issued after the applicant's BACT analysis was published in the May 2004 Application. Thus, the BACT analysis is stale. BACT must be established as of the date of issue of the final Permit, not based on information that is over two years old. (We also note that the additional sources consulted by EPA are well known to be outdated and inaccurate.) The applicant and EPA did not update this stale determination or consult the most important sources as to achieved NOx levels, the most recent Clean Air Market NOx CEMS data reported quarterly to the U.S. EPA itself and vendors who design SCR systems.

I.C.1.b Lower NOx Limits Have Been Guaranteed

The Application conceded that the W.A. Parish facility in Texas was being designed for a NOx emission limit of 0.03 lb/MMBtu, but then went on to argue that it did not have to consider it since this levels had not been demonstrated. Ap., pp. 4-4 to 4-5. As noted in Comment I.A, a limit does not have to be "demonstrated" to satisfy BACT. The other reasons advanced for not considering this much lower NOx levels are discussed in Comment I.C.2.

Most major SCR vendors currently offer and have offered and provided SCRs guaranteed to achieve 0.03 lb/MMBtu and below for units firing all coal types. These include Babcock Power, Haldor Topsoe, CERAM, Siemens, and Cormetech. See, for example, vendor presentations at the McIlvaine SCR Hot Topic session on October 12, 2006,[4] and vendor guarantees offered for Trimble Unit 2 in Exhibit 2. The Trimble unit will burn a high sulfur, high nitrogen bituminous coal. The boiler outlet NOx level for this facility (0.3 lb/MMBtu) is likely higher than Desert Rock, requiring a higher efficiency SCR. Further, Texas concluded over 5 years ago that a NOx limit of 0.030 lb/MMBtu "is technically feasible… based on the literature and discussion with SCR vendors." At that time, one utility (Reliant) had awarded a contract to construct SCRs on four coal-fired boilers guaranteed at 0.030 lb/MMBtu (the four Parish Units). Ex. 3.[5]

The November 2, 2006 McIlvaine Utility E-Alert notes: "Haldor Topsoe reported they have provided catalyst for several installations that consistently run at less than 0.03 lb/MMBtu NOx." Ex. 17.[6] The McIlvaine reports are one of the sources the NSR Manual states should be considered in a BACT analysis. NSR Manual, p. B.12.

I.C.1.c Low NOx Limits Have Been Achieved

SCR system designers have analyzed EPA's Clean Air Market's CEMS data to determine the NOx levels that are currently being achieved by over 100 SCR-equipped coal-fired boilers. This analysis identified 25 units that are achieving NOx emissions less than 0.05 lb/MMBtu on an hourly basis. Ex. 6, p. 28; Ex. 7, p. 75-77.

Experience outside of the U.S. should also be considered in a top-down BACT analysis. NSR Manual, p. B.12. Several facilities outside of the U.S. have achieved lower NOx emission

[4] Voice recording available online to subscribers of McIlvaine Power Plant Knowledge System.

[5] Texas Register, v. 26, no. 2, January 12, 2001, p. 557.

[6] Utility E-Alert 798, November 2, 2006, Hot Topics, Haldor Topsoe Catalyst Efficiency Revisted, page pdf 12.

limits. These include the 250 MW Amager Power Station in Denmark, which is achieving NOx levels of less than 0.04 lb/MMBtu. This plant started up in October 2000 and was designed for 2.5% S coal but currently burns coal with a sulfur content similar to that proposed for Desert Rock. Operating and emissions data are summarized in Ex. 10.[7] Several units are operating at low NOx levels in Japan. The EPA should update its historic survey of foreign experience.

I.C.1.d Boiler Efficiency

The permitted NOx limits that were (improperly) relied on (SOB, p. 13) to establish NOx BACT are based on subcritical boilers. Desert Rock will use supercritical boilers. SOB, p. 1. A supercritical boiler is more efficient (typically 41%) than a subcritical boiler (typically 34-38%). This means that less coal is burned and less NOx, SO_2, PM, PM10, etc are emitted from a supercritical boiler than a subcritical boiler per megawatt hour of electricity generated. Ex. 11.[8] The lower outlet NOx would not affect the degree of NOx reduction that an SCR can achieve. Thus, the achievable NOx emission rate for a supercritical boiler should be about 20% lower than the achievable rate for a comparable subcritical boiler. This was not considered in EPA's BACT analysis.

I.C.2 The NOx Control Myths

The applicant's and EPA's NOx BACT analyses (Ap., Sec. 4.2 and SOB, pp. 12-14) are based upon two widely advanced myths. These myths have been rebutted by SCR design engineers by comprehensively analyzing the performance of over 100 units equipped with the BACT technology (low NOx burners and SCR) proposed for Desert Rock. See Ex. 4,[9] Ex. 5,[10] Ex. 6,[11] and Ex. 7.[12] These "myths," relied on to set Desert Rock's NOx BACT limit, are discussed below. The EPA should reject these myths and set a NOx BACT limit based on what is achievable for a new supercritical boiler.

I.C.2.a Coal Type Should Not Dictate BACT

The EPA argues, based on the Newmont EAB decision, that coal type, among other factors discussed below, should dictate the NOx BACT limit. SOB, p. 14. The applicant also argued that BACT limits based on PRB coals needed to be adjusted to the equivalent levels that can be achieved with the Navajo subbituminous coal. Ap., p. 4-3. However, recent analyses of

[7] Topsoe DENOX Catalysts, DNX-Series, Industrial Experience, Amager Power Station Unit 3.

[8] E.S. Sadlon, Alstom, Application of State-of-the-Art Supercritical Boiler Experience to U.S. Coals – Corrosion Consideration, CoalGen 2000.

[9] Clayton A. Erickson and James E. Staudt, Selective Catalytic Reduction System Performance and Reliability Review, Mega Symposium, 2006.

[10] James E. Staudt and Clayton Erickson, Selective Catalytic Reduction System Performance and Reliability Review, Slides, Mega Symposium, 2006.

[11] Clay Erickson, Robert Lisauskas, and Anthony Licata, What's New in SCRs, DOE's Environmental Control Conference, May 16, 2006.

[12] Selective Catalytic Reduction: From Planning to Operation, Competitive College, PowerGen 2005, December 2005.

NOx CEMS data reported to the EPA indicate that coal type does not affect the achievable NOx emission rate. The same NOx emission level can be achieved, regardless of coal type, through proper design of the low NOx burners and SCR. The design parameters must be varied to achieve a given NOx emission rate, not the other way around. Ex. 4, p. 7; Ex. 5, pp. 12-14.

The applicant argued that lower NOx levels achieved on units firing PRB coal were not relevant because PRB coals have lower fuel nitrogen content and a greater percentage of fuel nitrogen in the volatile fraction, implying that lower boiler outlet NOx means lower stack NOx. Ap., p. 4-4, Table 4-1, note 2. However, recent analysis of the entire fleet of SCR-equipped coal-fired units in the U.S. refutes this argument.

This recent analysis concluded that "both fuels [PRB and bituminous] are very similar in their attainable outlet NOx values." Ex. 4, p. 7. Elsewhere, "SCR systems on PRB fired unit (sic) have no greater control or reliability issues compared to bituminous." And "SCR system on bituminous fired units can attain, with high removal efficiencies, outlet NOx emission limits in the same range or better than PRB unit with combustion NOx control system" *Ibid.* Thus, if Navajo coal burned in a supercritical boiler generated a higher boiler outlet NOx level than an equivalent PRB-fired unit, the SCR need only be designed to achieve a higher removal efficiency to satisfy BACT.

Finally, the definition of BACT requires that clean fuels be considered. The Application indicates that rail service is not available, thus precluding PRB. Ap., p. 4-3. However, this does not preclude importing PRB or another local coal by truck, or barge plus truck, or blending on-site coals from different seams. If PRB or other local coals allow lower NOx emissions, then the BACT analysis must consider these cleaner fuels, *e.g.*, PRB or a blend with PRB if EPA alleges that the achievable NOx limit is restricted by the coal type. The NOx BACT analysis did not consider cleaner fuels.

I.C.2.b Ozone Season v. Year Round Operation Is Not Material

The EPA argues, based on the Newmont EAB decision, that permits that only require ozone season operation are not persuasive. SOB, p. 14. This questionable legal conclusion has been superceded by a detailed technical analysis of NOx CEMS data reported to the EPA and posted on the Clean Air Markets website.

First, we note that CAIR will require year-round operation by 2009 of ozone-season SCRs, so this point is mute. The EPA has concluded that ozone season units can be operated on a year-round basis. If they can be operated on a year-round basis, year-round operation is a reasonable basis for a BACT determination.

Second, twelve year-round SCRs were analyzed to determine if they were distinguishable from ozone-season units. Four of these units were originally designed for ozone season operation and subsequently converted to year round. Ex. 4, pp. 13-15. The variability of NOx, as expressed by the coefficient of variation (CV) of these 12 units is consistent with the variability of NOx from ozone season only units. Compare the CVs shown in Figure 18 (year round units) with Figures 2 and 4 (ozone season units).

I.C.3 Flawed Legal Framework For NOx BACT Determination

As discussed in Comment I.B, BACT is an emission limit based on the maximum degree of reduction that is achievable. The NOx BACT analysis fails to meet this fundamental requirement.

I.C.3.a BACT Is The Lowest Limit That Is Achievable

The Application asserts: "we conclude that the lowest NOx emission rate that have (sic) been demonstrated in practice and can be achieved for the particular coal available to Desert Rock Energy Center is 0.06 lb/MMBtu as a 24-hour average." Ap., p. 4-9. This is presumably based on Steag's 20+ years of field experience with SCR, mentioned in the preceding sentence. *Ibid.* However, the application does not disclose any information about Steag's SCR experience other than a cursory mention that it exists. Steag is a Germany utility with a large fleet of coal-fired units equipped with SCRs. Ap., p. 4-7. However, Steag's European experience is based on meeting a much higher NOx level than required by BACT in the U.S., generally 100 mg/Nm^3. Thus, we question whether this experience is sufficient to conclude that a lower NOx emission limit is not achievable as BACT in the U.S.

The EPA, after reviewing recent permitting decisions,[13] concurs. SOB, pp. 12-14. Both parties focused on what had been achieved, rather than what was "achievable." Further, neither party cast a wide enough net, even given their erroneous interpretation of the law. The NOx BACT limit must represent the lowest NOx emissions "achievable" by use of the proposed pollution controls. The EPA cannot rely on a retrospective survey of emission limits proposed or achieved in the past.

As discussed in Comment I.A, the BACT emission limit must be only "achievable," not achieved. The record contains no evidence that the EPA and the applicant attempted to determine what was "achievable" for NOx as opposed to what was "achieved." The EPA repeatedly justifies its BACT determination based on what has been permitted. It states that this limit: (1) "is lower than other NOx emissions rates that have been proposed for or achieved by pulverized coal fired boilers recently." (SOB, pp. 12-13); (2) "making the proposed NOx BACT emissions limit for DREF the lowest in an issued PSD permit for a pulverized coal fired boiler." (SOB, p. 14); and (3) "the NOx emission limit of 0.06 lbs/MMBtu as a 24 hour average is lower than any other reported BACT emissions limit." (SOB, p. 14). The record thus indicates that the EPA based its decision on what has been proposed in other permits, rather than what is "achievable" for Desert Rock in November 2006 based on engineering principles. Basing BACT limits on previously permitted limits is a self fulfilling prophecy that contravenes the technology-forcing nature of BACT.

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[13] The EPA asserts that it reviewed trade journals, information from industry conferences and vendor guarantees, but does not cite a single example of any of these. As we discuss in these comments, there are many examples of these latter sources that should have tipped EPA to the fact that lower NOx limits are achievable. The EPA should disclose the specific sources it reviewed so reviewers can judge whether the scope of review was adequate.

I.C.3.b Failure To Establish NOx BACT Based on Maximum Degree Of Reduction

The term "best available control technology" means "an emission limitation based on the maximum degree of reduction of each pollutant..." The EPA ranked the control effectiveness of various NOx control technologies. The top-ranked control technology combination is SCR and low-NOx burners. SOB, p. 8, Table 3. The EPA concluded that BACT is the lowest permitted NOx emission limit based on this technology. SOB, p. 14. This process is not consistent with the definition of BACT or EPA's implementation of this definition using the top-down process. It has led to the wrong result.

The Application and SOB contain no evidence that the proposed NOx BACT limit of 0.06 lb/MMBtu is based on the maximum degree of reduction that is achievable. The Application and SOB do not contain any ranking of control **alternatives** comparable to the examples in the NSR Manual in Tables B-2 and B-3, but rather only rankings of control **technologies**. A control alternative requires an emission limit (*e.g.*, ppm, lb/MMBtu, lb/hr) and a performance level (*e.g.*, percent reduction, emission reduction). NSR Manual, Sec. IV.C.3.

The Application and SOB do not include any performance data, required to prepare such rankings. The boiler outlet NOx (determined by low NOx burner and other combustion control designs in conjunction with coal characteristics) and the SCR design control efficiency are both required to determine the degree of NOx reduction. Neither is reported in the Application or SOB. Thus one is left to guess whether the maximum degree of reduction is required.

It appears that the maximum degree of reduction has not been required. The BACT NOx emission level will be achieved using low-NOx burners and SCRs. Modern low-NOx burners have achieved a NOx outlet of less than 0.20 lb/MMBtu on a wide range of coals, including low sulfur subbituminous coals similar to Desert Rock's. Ex. 8A,[14] 8B.[15] Moderns SCRs routinely achieve NOx removal efficiencies greater than 90%. Ex. 4, pp. 1, 15; Ex. 5, p. 30; Ex. 7, p. 77. Detailed analyses of EPA Clean Air Markets data indicates that "90% removal efficiency is currently being achieved by a significant portion of the coal-fired SCR fleet." Ex. 4, p. 15. Greater than 30 units have achieved greater that 90% NOx reduction. Ex. 4, p. 1. 90% NOx removal was achieved on 10,000 MW of coal-fired generation in 2004. Ex. 7, p. 77. Many coal-fired units have been guaranteed to achieve greater than 90% NOx reduction. Ex. 9. The McIlvaine reports, one of the sources the NSR Manual states should be considered in a BACT analysis (NSR Manual, p. B.12), indicate three of Haldor Topsoe's SCR installations averaged over 95% NOx reduction during the 2005 ozone season. Ex. 17.[16]

The achievable NOx emission limit for Desert Rock would be about 0.02 lb/MMBtu, if the boiler outlet NOx were 0.2 lb/MMBtu (a typical value) and the SCR achieved 90% NOx control (also typical). Assuming a boiler outlet of 0.3 lb/MMBtu, which would be very high for a new supercritical boilers burning Navajo coal, the achievable NOx emission limit would be

[14] NOx Ranking based on EPA Clean Air Markets CEMS Data for 2003.

[15] T. Whitfield and others, Comparison of NOx Emissions Reductions with PRB and Bituminous Coals in 900 MW Tangentially Fired Boilers, 2003 Mega Symposium.

[16] Utility E-Alert 798, November 2, 2006, page pdf 12.

0.03 lb/MMBtu, half of that picked by the applicant and EPA based on permitted levels. Thus, we urge the EPA to revisit the NOx BACT determination. We also urge EPA to specifically request LNB and SCR design specifications (boiler outlet NOx, SCR NOx control efficiency, type of catalyst, catalyst pitch, number of catalyst layers, catalyst lifetime, pressure drop, SO_2 to SO_3 conversion rate, etc). This information is essential to determine BACT for both NOx and sulfuric acid mist, discussed elsewhere in these comments.

I.D BACT Is Not Required For VOC And CO Emissions From PC Boilers

The EPA concludes that BACT for CO is 0.010 lb/MMBtu (SOB, p. 21) and BACT for VOC is 0.003 lb/MMBtu (SOB, p. 23). These determinations have two problems in common.

First, EPA's BACT determinations for both CO and VOCs report a range of previously permitted CO (0.05-0.15 lb/MMBtu) and VOC (0.002-0.01 lb/MMBtu) limits. SOB, Tables 5 & 6. These tables were copied from the Application. However, the SOB and the Application do not explain why the lowest reported CO and VOC limits do not constitute BACT in this instance.

Second, Desert Rock will use a supercritical boiler. Ap., p. 2-2 and Attach 1. A supercritical boiler is more efficient than a subcritical boiler, or the so-called standard PC boiler, and thus is able to achieve lower emissions, including lower CO and VOC.[17] Ex. 11. Most of the permitted CO and VOC limits relied on by both the applicant and EPA are based on the less efficient subcritical boiler technology. Thus, Desert Rock should be able to meet the lowest reported CO and VOC limits and likely could meet even lower CO and VOC limits than previously permitted and relied on here. The technology forcing nature of BACT requires that EPA lower the VOC and CO BACT limits to address the higher efficiency and thus lower emissions that can be achieved with a supercritical boiler.

I.E BACT Not Required For Particulate Matter Emissions From PC Boilers

I.E.1 BACT Not Required For PM10

The applicant proposed a PM10 (filterable plus condensable) BACT emission limit of 0.02 lb/MMBtu, but requested a 3-year trial period to determine its feasibility. The EPA independently reviewed the applicant's analysis and affirmed the proposed PM10 limit, but concluded that only an 18-month trial was warranted. SOB, pp. 26-27. This comment addresses the fact that BACT for PM10 is lower than 0.02 lb/MMBtu. The next comment addresses the optimization period.

The EPA provides no support for its assertion that BACT for PM10 is an emission limit of 0.020 lb/MMBtu. SOB, p. 27. Lower PM10 limits have been set in recent permits and achieved in stack tests. The following permits have been issued with lower total PM10 limits:

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[17] E.S. Sadlon, Alstom, Application of State-of-the-Art Supercritical Boiler Experience to U.S. Coals – Corrosion Considerations, CoalGen 2004; Tim O'Brien and Steve Pieschl, Black & Veatch, Black & Veatch Advanced Supercritical Pulverized Coal Reference Plant, CoalGen 2005; P. Armstrong and others, Design and Operating Experience of Supercritical Pressurized Coal Fired Plant.

- 0.0088 lb/MMBtu for Northampton, PA
- 0.010 lb/MMBtu for Seward, PA
- 0.018 lb/MMBtu for Hawthorn, MO
- 0.018 lb/MMBtu for Elm Road, WI
- 0.018 lb/MMBtu for Longview, WV
- 0.018 lb/MMBtu for Thoroughbred, KY
- 0.018 lb/MMBtu for City Utilities, Springfield, MO
- 0.018 lb/MMBtu for Iatan, MO
- 0.018 lb/MMBtu for Plumb Point, AK

We assume that EPA has access to all of these permits, which are available on line. However, if it does not, we can supply copies on request. Two of these facilities are CFBs that burn high sulfur, high ash fuels (Northampton, Seward). These CFBs represent a worst case for PM control at Desert Rock because the fly ash is recirculated, resulting in high baghouse inlet PM concentrations, roughly twice as high as Desert Rock based on a design ash content of 20.5%. Three of these facilities have been built and tested at a lower total PM10 emission rate than proposed for Desert Rock. This test data includes the following:

- 0.0044 lb/MMBtu for Northampton in 2001 (Ex. 13)
- 0.0012 lb/MMBtu for Northampton in 1995 (Ex. 12)
- 0.0041 lb/MMBtu for Seward in 2005 (Ex. 14)
- 0.0114 – 0.0170 lb/MMBtu for Hawthorn in 2001-2004 (Ex. 15)

These stack tests are attached as Exhibits12 to 15.

I.E.2 BACT For PM10 Deferred To Future

The Draft Permit allows EPA to increase the proposed PM10 BACT limit of 0.020 lb/MMBtu based on testing during an 18-month period. Permit, p. 11, Condition IX.T. There are four problems with this after-the-fact BACT analysis.

First, it allows EPA to make a BACT determination outside of public review, off-the-record, and post construction. BACT is a preconstruction requirement that requires public review.

Second, even assuming this off-the-record procedure is legal, the proffered condition does not explain what process would be used or how much data would be required to revise the PM10 limit. Instead, it gives EPA carte blanche to set a new limit based on whatever testing the applicant conducts in a 18-month period.

Third, the condition puts the cart before the horse. The Permit should establish BACT, require that the control system be designed to meet it, and, if uncertainty is demonstrated to exist,

include an optimization study to determine if a lower limit can be met, rather than a grant to raise the limit. A lower limit should be imposed if testing demonstrates it is feasible. If the BACT limit cannot be met in the optimization study based on appropriate design and best efforts, the permit should be reopened to establish a higher limit.

Finally, any increase in the PM10 emission limit would trigger revisions in other PSD requirements, including the visibility, Class I and II, and the additional impact analyses. Thus, EPA cannot allow any increase in PM10 emissions without going through a formal PSD permit revision and without providing public notice and review.

The 18-month optimization condition, if retained, should specify the type and amount of testing required to support a new BACT determination, should clearly state that a decision to revise the limit would reopen the permit and trigger a formal PSD review, should require a top down BACT determination that considers all other PM10 data from other facilities then available, and should state that the proposed PM10 limit will be lowered if testing demonstrates a lower limit is achievable.

I.F No Startup And Shutdown BACT Analysis

The Draft Permit excludes periods of startup and shutdown from the BACT limits. The control equipment required to meet BACT must be operated continuously, except during periods of startup and shutdown. Permit, p. 3, Condition IX.B.7. Separate emission limits are set for SO_2, NOx, and CO during startups and shutdowns. Permit, p. 7, Condition IX.N.1. Further, emissions from startups and shutdowns need only be included in calculations of hourly and annual mass emission rates, *e.g.*, lb/hr, which term excludes limits that are not mass emission rates, *e.g.*, lb/MMBtu, the metric selected for BACT.

It is well established that BACT applies during all periods, including periods of startup and shutdown. *See* Memorandum from John B. Rasnic to Linda Murphy (Jan. 28, 1993); Memorandum from Kathleen Bennett to Regional Administrators re: Policy on Excess Emissions During Startup, Shutdown, Maintenance and Malfunctions (Feb. 15, 1983). *See also In re Tallmadge Generation Station*, Order Denying Review and Remanding in Part, PSD Appeal No. 02-12, Slip Op. (E.A.B. May 21, 2003) ("BACT requirements cannot be waived or otherwise ignored during periods of startup and shutdown"; *In re Indeck-Niles Energy Center*, PSD Permit No. 364-00A, PSD Appeal No. 04-01, 2004 EPA App. Lexis 39 n.9 (EAB Sept. 30, 2004). The Application and SOB are silent as to BACT during periods of startup and shutdown. The Permit explicitly exempts these periods from BACT and other emission limits in Condition IX.B.7 and sets separate limits for SO2, NOx, and CO that apply only during periods of startup and shutdown. Permit, p. 7, Condition IX.N.

The record we reviewed does not contain any support for these alternative startup and shutdown limits, most notably, a top-down BACT analysis explaining their basis. Thus, we further request that EPA explain the basis for the startup and shutdown limits found in Condition IX.N and provide a supporting top-down BACT analysis. Further, the startup and shutdown emissions should be included in the air quality analyses.

I.G BACT Is Not Required For Sulfuric Acid Mist Emission From PC Boilers

The EPA concludes that BACT for sulfuric acid mist (SAM or H_2SO_4)[18] is an emission limit of 0.004 lb/MMBtu without performing a top-down BACT analysis. SOB, p. 29. The EPA copies the Application, which also does not contain a top-down BACT analysis. Instead, both the SOB and Application argue with no support that BACT is 0.004 lb/MMBtu because the use of sorbent injection can achieve an emission level lower than permitted for Thoroughbred (0.00497 lb/MMBtu), which uses a wet electrostatic precipitator (WESP). SOB, pp. 28-29 and Ap., Sec. 4.7. There are several problems with this determination.

First, there is no top-down BACT analysis. A BACT emission limit was plucked out of thin air. The Application states that a hydrated lime technology will be used to control acid gases upstream of the fabric filter. Ap., p. 4-23. There is no evidence that other technologies or combinations of technologies were considered that could result in higher removal efficiencies and thus a lower SAM limit. The Application and SOB do not contain step 1 (identify technologies), step 2 (eliminate infeasible options), step 3 (rank remaining options), or step 4 (evaluate most effective controls and document) of the top-down process. NSR Manual, p. B.6. There are many control options that should have been evaluated including: (1) the use of a low SO_2 to SO_3 conversion SCR catalyst (Ex. 16, 17); (2) SCR catalyst washing (Ex. 18); (3) other sorbents such as SBS and trona (Exs. 19, 20); (4) wet electrostatic precipitators (Ex. 21); (5) a more efficient SO_2 scrubber; (6) air heater additives; and (7) combinations of these methods (Ex. 22), among others. NSR Manual, p. B.17 ("combinations of techniques should be considered to the extent they result in more effective means of achieving stringent emissions levels…").

Second, the comparison to Thoroughbred is irrelevant. The Thoroughbred limit is not the lowest permitted or achieved SAM limit (see below). Further, the Thoroughbred plant will burn high sulfur, bituminous coal with a sulfur content of 8.5 lb SO_2/MMBtu, while Desert Rock will burn subbituminous coal with a sulfur content of 1.84 lb SO_2/MMBtu, or nearly five times lower. Some of this sulfur is converted into SAM, as shown by Exhibit 23, discussed below. Generally, all else constant, the less sulfur, the less SAM. Thus, a much lower SAM limit should be achievable for Desert Rock than Thoroughbred, because five times less sulfur is available to convert to SAM. This does not satisfy BACT, which is an emission limit based on the maximum degree of reduction. If the same degree of reduction were required for Desert Rock as required for Thoroughbred (98%), a much lower SAM limit would result.

Third, a "proprietary" technology (SOB, p. 29) is proposed to control SAM. The process used to select hydrated lime as the top technology and the design details of this system are not provided, *e.g.*, amount of sorbent to be injected, design SAM control efficiency. The design basis must be provided to allow step 3 ranking and step 4 costing. NSR Manual, Sec. IV.C.3

[18] Burning coal in the boilers converts sulfur in the coal into gases, including sulfur dioxide (SO_2) and sulfur trioxide (SO_3). Sulfur trioxide is present as a gas in the heated combustion gases. Sulfur trioxide is also generated and removed downstream of the boiler, in the pollution control system and air preheaters. The sulfur trioxide combines with water in the combustion gases and is converted into very small liquid droplets of sulfuric acid (H_2SO_4), called sulfuric acid mist, before it leaves the stack. In these comments, the terms H_2SO_4, and sulfuric acid mist or SAM are used interchangeably to refer to sulfuric acid mist emissions from the stacks, as limited in the Draft Permit, Condition IX.K. See Ex. 23.

(explaining how BACT is selected by ranking most effective to least effective emission controls using "performance level" or emissions calculated there from) and IV.D.2. Otherwise, there is no basis to conclude that BACT is 0.004 lb/MMBtu, or any other value. See discussion in Comment I.B.

Finally, the SAM limit included in the Permit, 0.004 lb/MMBtu, is not BACT for SAM, even assuming EPA's previously permitted rationale were correct. Lower limits have been permitted and are reported in the RACT/BACT/LAER Clearinghouse or subject permits. These include:

- 0.0010 lb/MMBtu for Newmont, NV
- 0.001 lb/MMBtu for TS Power, NV
- 0.0015 lb/MMBtu for Parish Unit 8, TX
- 0.0014 lb/MMBtu for Santee Cooper Cross, SC
- 0.002 lb/MMBtu for SEI Birchwood, VA
- 0.0024 lb/MMBtu for AES Puerto Rico

Sulfuric acid mist is created in the boiler and SCR system. Some of this SAM is removed by the air preheater, fabric filters, SO_2 scrubber, and hydrated lime system. Ex. 23.[19] The SAM limit that is achievable for Desert Rock depends on the interaction of all of these factors. The Application and SOB do not contain any of the information required to calculate the creation and removal of SAM so you can arrive at a SAM BACT limit at the stack. Thus, there is no basis for the SAM BACT limit.

We calculated achievable SAM emissions for the proposed coal using the Southern Company calculation procedure Ex. 24.[20] and default assumptions because the record does not contain most of the required information for Desert Rock. The Southern Company method is widely used to calculate SAM emissions and BACT limits for PSD permits.

We made calculations for three cases: (1) our guess as to what was assumed to generate the BACT level of 0.004 lb/MMBtu; (2) the use of low SO_2 to SO_3 conversation SCR catalyst (<0.5%)[21] and a WESP or other SAM control method capable of achieving 90% SAM control (Ex. 21); and (3) the same as option (2) but with a 98% efficient SAM control system (based on vendor guarantees for Trimble Unit 2 and Thoroughbred). These options are currently in use at coal-fired power plants and will be guaranteed by vendors. These calculations indicate that the proposed facility should be able to meet a SAM limit of less than 0.001 lb/MMBtu. Ex. 25.

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[19] R.K. Srivastava, C.A. Miller, C. Erickson, and R. Jambhekar, Emissions of Sulfur Trioxide from Coal-Fired Power Plants, *Journal of the Air & Waste Management Association*, v. 54, 2004, pp. 750-762.

[20] Larry S. Monroe, *An Updated Method for Estimating Total Sulfuric Acid Mist Emissions from Stationary Power Plants*, Revised March 2003by Keith E. Harrison, Southern Company Generation and Energy Marketing.

[21] A <0.5% SO_2 to SO_3 conversion catalyst has been demonstrated at AEP's Gavin facility and IPL's Petersburg facility Ex. 16. However, even lower conversions have been reported, <0.1%. Ex. 16C, p. 2 and Ex. 17, page pdf 12.

I.H BACT Is Not Required For Lead Emissions From PC Boilers

The lead limits in the Draft Permit, 1.33 lb/hr and 0.0020 lb/MMBtu based on a 3-hour period, are not supported in the record. Permit, p. 7, Condition IX.L. The permitted lead emissions exceed 0.6 ton/yr, the PSD significance threshold for lead, thus requiring a top-down BACT analysis.

The Application argues that lead is emitted as solid particulate and thus is included in the PM and PM10 BACT emission limits. The Application did not set a separate lead limit but instead concluded that BACT for lead is the use of fabric filters and the PM10 BACT emission limits. Ap., p. 4-23. The SOB makes the identical argument. SOB, pp. 29-30. However, the Permit contains lead BACT limits (Permit p. 7) that appear to have been plucked out of thin air. The files we reviewed do not even indicate the assumed lead content of the coal, the starting point for a lead BACT determination.

The available information indicates that the proffered limits are not BACT for lead. Much lower limits have been permitted. See, for example, Thoroughbred (0.00000386 lb/MMBtu), Trimble Unit 2 (0.000018 lb/MMBtu),[22] Keystone Cogeneration (0.0000046 lb/MMBtu), Spruce Unit 2 (0.0000084 lb/MMBtu), Springerville Units 3 & 4 (0.000016 lb/MMBtu), and Holcomb Unit 2 (0.000021 lb/MMBtu), among others. Permits and RACT/BACT/LAER Clearinghouse.

Further, the coal combustion section of AP-42 (Ex. 26) includes an equation, rated A, to calculate the lead emissions, given the lead (C) and ash (A) content of the coal and the particulate emissions in lb/MMBtu (PM):

$$\text{Lead (lb/10}^{12}\text{ Btu)} = 3.4(C/A*PM)^{0.8}$$

AP-42, Table 1.1-15.

The Application for the competing Cottonwood Energy Center, which would use the same coal, indicates that the lead content of the subject coal ranges from 5 ppm to 40 ppm (C) and averages 15 ppm. Ex. 27.[23] The design ash content for Desert Rock is 20.5% (A) and the PM BACT limit is 0.010 lb/MMBtu (PM). Thus, the controlled lead emission limit, corresponding to the BACT PM limit is:

$$\text{Lead (lb/10}^{12}\text{ Btu)} = 3.4(40/0.205*0.01)^{0.8}$$

$$= 5.80 \text{ lb/10}^{12}\text{ Btu}$$

$$= 0.0000058 \text{ lb/MMBtu}$$

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[22] Ex. 1, p. 29: (0.55 ton/yr)(2000 lb/ton)/(8760 hr/yr)(6942 MMBtu/hr) = 0.000018 lb/MMBtu.

[23] Chaco Valley Energy, LLC, *Cottonwood Energy Center, Prevention of Significant Deterioration (PSD) Permit Application*, March 2004, p. 8, Table 1-1.

This lead emission factor is 34 times lower than the lead emission limit included in the Draft Permit. Thus, the permit limits do not satisfy BACT for lead.

We further note that the assumption that BACT for PM and PM10 satisfies BACT for lead is not correct. Lead is volatilized in the boiler and condenses as very fine particulate matter or nanoparticles (<2.5 microns) in the pollution control train. Ex. 32.[24] The highest concentrations of lead are consistently found in the smallest particles. Ex. 28,[25] 34.[26] The particulate collection efficiency for baghouses designed to collect PM and PM10 is generally lower for these nanoparticles that contain most of the lead than for larger particles. Ex. 26, Table 1.1-5, Ex. 33, p. 1582, Ex. 34, p. 1538. Thus, a fabric filter system designed to meet BACT for PM and PM10 does not necessarily meet BACT for particles smaller than 10 microns where most of the lead is found. These smaller particles also cause proportionately more of the adverse health impacts because they can penetrate deep into the lung. Ex. 33.

A BACT analysis for lead must consider methods to enhance the removal of these finer particles. Methods to enhance the control of fine lead particles include: (1) use of a filtration media with a higher removal efficiency for nanoparticles; (2) use of a wet electrostatic precipitator (Ex. 29); and (3) use of an agglomerator upstream of the baghouse. An agglomerator uses electrical charges to attach nanoparticles to larger particles, which are then more efficiently removed by the baghouse.[27] Agglomerators have been used to reduce opacity (caused by nanoparticles) and PM at several coal fired power plants.[28] Ex. 30.

I.I The Draft Permit Does Not Contain Any BACT Conditions For Material Handling

Desert Rock will emit PM and PM10 from equipment used to handle, convey, and store materials including coal, limestone, gypsum, fly ash, and bottom ash. These emissions will be controlled by dust suppression, enclosures, and/or fabric filters. Ap., Sec. 4.6.4. However, the Draft Permit does not contain any limits whatsoever for material handling.

For sources vented through baghouses, the applicant proposed BACT PM/PM10 limits of 0.005 grains per dry standard cubic foot (gr/dscf) for coal and 0.01 gr/dscf for limestone and other materials. Ap., p. 4-22. The EPA adopted these limits with no further investigation. SOB, p. 28. These limits are not included in the Draft Permit and thus are not enforceable.

Further, the proposed baghouse limits are not supported by a top-down BACT analysis. Instead, the Application asserts with no support that these emission levels constitute BACT. Ap.,

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[24] R.C. Flagan and S.K. Friedlander, Particle Formation in Pulverized Coal Combustion – A Review, In: *Recent Developments in Aerosol Science*, D.T. Shaw (Ed.), 1978, Chapter 2.

[25] Richard L. Davidson and others, Trace Elements in Fly Ash, *Environmental Science & Technology*, v. 8, no. 13, December 1974, pp. 1107-1113; E.S. Gladney and others, Composition and Size Distribution of In-State Particulate Material at a Coal-Fired Power Plant, *Atmospheric Environment*, v. 10, 1976, pp. 1071-1077.

[26] W.P. Linak and others, Comparison of Particle Size Distributions and Elemental Partitioning from Combustion of Pulverized Coal and Residual Fuel Oil, *J. Air & Waste Manage. Assoc.*, v. 50, 2000, pp. 1532-1544.

[27] McIlvaine Hot Topic Hour, Impact of PM2.5 on Power Plant Choices, November 2, 2006. Voice recording available online to subscribers of McIlvaine Power Plant Knowledge System.

[28] http://www.indigotechnologies-us.com/current_installations.php

p. 4-22. Lower grain loadings have been recently permitted for material handling baghouses at other similar sources including:

- 0.004 g/dscf for coal and limestone collectors at Elm Road, WI
- 0.005 g/dscf for coal and limestone collectors at MidAmerican, IA
- 0.005 g/dscf for all baghouses at Indeck-Ellwood, IL

Thus, BACT for PM/PM10 for material handling operations vented to a baghouse should be a grain loading of no more than 0.004 gr/dscf for all materials.

For fugitive sources, the applicant identifies some controls for the inactive storage—covering the pile with soil, geotextile, chemical crusting agents or watering—but is silent as to how fugitive emissions from the active pile would be controlled. Ap., p. 4-22. The EPA adopts the applicant's language with no further investigation. SOB, p. 28. The applicant "believes" that these operational measures and those of NSPS for coal handling represent BACT for inactive storage and associated coal handling. *Ibid.* However, the applicant's "belief" is not a rational basis for a BACT determination. In fact, the Application and SOB contain no BACT analysis for any material handling operation and is totally silent as to fugitive dust controls for the active coal pile.

The baghouse grain loadings and other controls (enclosures, dust suppression) that were selected and used as the basis for estimating emissions included in dispersion modeling are not included in the Draft Permit and thus are not enforceable. BACT limits must be enforceable, which means a condition limiting emissions must be included in a federally enforceable permit together with monitoring, recordkeeping and reporting to assure that they are met. The applicant should be required to prepare a BACT analysis for material handling equipment and fugitive sources, the Draft Permit revised to include the limit(s), and recirculated for public review.

I.J BACT Is Not Required For Fuel-Oil Fired Sources

The facility includes three auxiliary boilers, two emergency diesel generators, and two firewater pumps, all fired on distillate oil. The Application and SOB include BACT limits for these sources. SOB, p. 31, Tables 9, 10; Ap., Sec. 4.0. There are several issues with these limits.

First, the Permit does not contain most of the BACT limits listed in the SOB and Application. Compare SOB, Tables 9 and 10, with the Draft Permit, Conditions IX.O and IX.P. The Draft Permit, for example, does not contain any limits on emissions of any pollutant from the emergency generators. Further, the Draft Permit does not contain any limits expressed in lb/MMBtu, the BACT metric, for any pollutant, from the auxiliary boiler. The Permit only contains limits in lb/hr. Emission limits should be expressed in two ways, as explained throughout the NSR Manual (*e.g.*, pp. B.56, H.10) and as practiced for the PC boilers. Permit, Condition I.X.

Second, the bases for the oil-fired source limits are not disclosed. They are merely stated as meeting BACT with no top-down analysis.

Third, the proffered limits do not satisfy BACT. Much lower limits have been permitted and achieved for these sources for all relevant pollutants.

The definition of BACT requires that clean fuels be considered. Thus, BACT for fuel-oil fired sources is natural gas when a natural gas supply is available. The Application and SOB are silent as to availability of natural gas. Further, the Application and SOB state with no support that BACT for SO_2 for these sources is burning low sulfur distillate oil with a maximum sulfur content of 0.05%. SOB, p. 19 and Ap., p. 4-13. The basis for 0.05% and not a lower sulfur oil is not disclosed. Even assuming that distillate oil qualifies as BACT, cleaner distillate oils are available. A sulfur content of 15 ppm is required by regulation for some classes of diesel engines (ASTM Grade No. 2-D-S15) and thus these low sulfur fuels are widely available. These low sulfur distillates have been required to satisfy BACT for these same sources at other coal-fired power plants, *e.g.*, Trimble Unit 2 (Ex. 1), Spurlock.

Further, much lower NOx, CO, and VOC limits can be achieved by these sources using post-combustion controls, including SCR for NOx and oxidation catalysts for CO and VOCs. These control options were not evaluated in the Application or SOB but have been required to satisfy BACT and LAER at similar sources. See, for example, the auxiliary boiler at the Crockett Cogeneration Facility in California, which is equipped with both SCR and oxidation catalyst and has demonstrated compliance with much lower limits, as well as many other similar sources listed in the South Coast Air Quality Management District's BACT clearinghouse.

I.K BACT Is Not Required For Fluoride Emissions From The PC Boilers

The SOB concludes that BACT for hydrogen fluoride (HF) is 0.00024 lb/MMBtu, assuming 100 ppm fluorine in the coal and 98% control. SOB, p. 29. This limit is adopted as a 3-hour average in the Permit, Condition IX.M, p. 7. The SOB asserts that "[t]his emission rate [0.00024 lb/MMBtu] is consistent with or lower than all recent BACT decisisons." SOB, p. 29. This is incorrect. Much lower fluoride BACT determinations have been made recently, including for Longview, WV (0.00001 lb/MMBtu); Thoroughbred, KY (0.00016 lb/MMBtu); and Trimble Unit 2 (0.000051 lb/MMBtu). Further, the SOB and Application do not contain a supporting BACT analysis or explain why these lower permitted values do not constitute BACT for Desert Rock.

II. ENFORCEABILITY ISSUES

II.A Testing Is Not Adequate To Assure Continuous Compliance

The statute and regulations define BACT as an "emission limitation." CAA Sec. 169(3) U.S.C. Sec 7479(3) and 40 CFR 52.21(b)(12). The CAA defines the term "emission limitation" as "a requirement established by the State or the Administrator which limits the quantity, rate, or concentration of emissions of air pollutants on a **continuous** basis, including any requirement relating to the operation or maintenance of a source to assure continuous emission reduction..." CAA Sec. 302(k), 42 U.S.C. Sec. 7602(k) (emphasis added). The monitoring required in the

Permit is not adequate to assure continuous compliance. The monitoring should be enhanced, as set out below.

II.A.1 Stack Testing Frequency

Permit limits can only be enforced through appropriate monitoring, testing and reporting of emissions. An appropriate hierarchy for specifying monitoring to determine compliance is: (1) continuous direct measurement where feasible; (2) initial and periodic direct measurement where continuous monitoring is not feasible; (3) use of indirect monitoring, *e.g.* surrogate monitoring, where direct monitoring is not feasible; and (4) equipment and work practice standards where direct and indirect monitoring are not feasible. NSR Manual, pp. H.10, I.3. The Draft Permit does not comport with this guidance.

The Draft Permit requires CEMS to determine compliance with limits on NOx, SO2, and CO. The intended use of the PM CEMS is ambiguous, as discussed in Comment II.B. Compliance with all other limits (VOC, PM10, H_2SO_4, HF, and lead) would be demonstrated by an annual stack test. After the initial stack test, the EPA "may waive a specific annual test and/or allow for testing to be done at less than maximum capacity." Permit, p. 3, Condition IX.C.1.

The BACT emission limits for these pollutants must be met on a "continual basis at all levels of operation.." NSR Manual, p. B.56. A stack test normally lasts only a few hours (3-6 hours) and is conducted under ideal, prearranged conditions. Staged annual or other periodic testing tells one nothing about emissions during routine operation or startups and shutdowns on the other 364 days of the year, or 8,750 plus hours. One 3-hour test per year over a 50-year facility life at 85% capacity amounts to testing only about 0.04% of the operating hours. This is a long way from demonstrating continuous compliance.

Further, annual stack testing does not capture spikes caused by normal process operations. Some routine process operations that occur only periodically, from daily to monthly, emit large amounts of VOCs, PM, and other contaminants. Emissions of PM10, for example, substantially increase during soot blowing, which is routinely used to clean deposits out of the boiler and to keep the SCR catalyst clean. Likewise, emissions of VOCs may increase during startups and shutdowns, but the Draft Permit does not require testing during these periods. Annual or other infrequent stack tests are almost never conducted during soot blowing, startups, or shutdowns, even though they are part of the routine operation of power plants.[29] These stack tests are, therefore, likely significantly underestimating emissions and are not sufficient to assure compliance with source emission limits.

Finally, it is well known that "[m]anual stack tests are generally performed under optimum operating conditions, and as such, do not reflect the full-time emission conditions from a source."[30] A widely-used handbook on Continuous Emissions Monitoring ("CEMs") notes, with respect to PM_{10} source tests, that: "Due to the planning and preparations necessary for these manual methods, the source is usually notified prior to the actual testing. This lead time

[29] This is despite EPA guidance stating that stack tests should be conducted during soot blowing. EPA "Restatement of Guidance on Emissions Associated with Soot-Blowing" (May 7, 1982).

[30] 40 Fed. Reg. 46,241 (Oct. 6, 1975).

allows the source to optimize both operations and control equipment performance in order to pass the tests."[31]

An annual stack test, particularly one that can be waived in the future, outside of the BACT process, does not provide any method to assure that the BACT limits are met on a "continual basis." The Permit should be revised to include either more frequent stack testing for pollutants not monitored by CEMS, CEMS where feasible, *e.g.*, sulfuric acid mist (Ex. 35) and PM, or include indicator monitoring (discussed in Comment II.A.3) to address those periods when direct stack testing is not conducted.

II.A.2 Testing Waiver

The performance testing condition allows EPA to waive annual testing or to allow testing at less than maximum operating capacity after the initial stack test. Permit, p. 3, Condition IX.C. Annual testing is not adequate, as explained in Comment II.A.2. Thus, further reducing annual testing is contrary to the requirement that BACT limits must be met continuously and thus must be continuously enforceable. Further, the testing provision is part of the BACT determination. NSR Manual, p. B.56. These test conditions cannot be "waived" without reopening the permit to make a new BACT determination. See also Comment I.E.2.

II.A.3 Surrogates For VOC, HF, H_2SO_4, Lead

As discussed above, no monitoring at all takes place during over 99% of the operating hours. The Draft Permit does not provide any means to determine compliance during these hours. Surrogate parameters can be continuously monitored during these times. A surrogate is an indicator parameter that is related to the parameter of interest. These are commonly used in PSD permits to demonstrate continuous compliance with parameters that cannot be monitored by CEMS, *e.g.*, HF, lead, and H_2SO_4. See, for example, the Permit issued by Kentucky to Thoroughbred and Trimble (Ex. 1).

The Draft Permit does not include any indicator monitoring to supplement annual testing. The use of indicators when a parameter cannot be continuously monitored is consistent with EPA's long-standing policy articulated in the NSR Manual: "[w]here continuous, quantitative measurements are infeasible, surrogate parameters must be expressed in the permit." NSR Manual, p. H.6.

Thus, we recommend that the EPA include surrogates. However, we note that this is a valid approach for "[o]nly those parameters that exhibit a correlation with source emissions...." NSR Manual, p. H.6. Thus, we recommend that the Permit be modified to require the use of surrogates to determine continuous compliance with the proposed limits on VOCs (CO), HF (coal fluoride content), lead (coal lead content), and H_2SO_4 (SO2 unless a continuous monitor for SAM is installed) if a study demonstrates an acceptable correlation between the parameter and the surrogate. The relationship developed in the study should be validated annually by simultaneous source testing and coal sampling, allowing for the residence time through the

[31] James A. Jahnke, *Continuous Emission Monitoring*, 2nd Ed., John Wiley & Sons, Inc., New York, 2000, at p. 241.

facility. The Permit also should state that exceedance of the indicator range is a per se violation of the regulated pollutant.

II.B PM Continuous Emission Monitoring System (CEMS)

The Draft Permit requires the installation of a CEMS to measure PM. Permit, p. 9, Condition IX.Q.1.ii. However, it is unclear whether this CEMS would be used to determine compliance with the PM BACT limit in Condition IX.H. Permit, p. 6. The Draft Permit is ambiguous as to continuous compliance with the PM BACT limit.

The Draft Permit states that "[e]xcess emissions shall be defined as any period during which the average emissions of SO2, NOx, CO or PM as measured by the CEMS exceeds the maximum emission limits set forth in Conditions IX.D, E, F and G..." Permit, pp. 10-11. This list of conditions excludes Condition IX.H which contains the BACT limit for PM, thus setting up an ambiguity as to whether the CEMS would be used to determine excess emissions of PM. Permit, p. 6. The Draft Permit then states that "[e]xcess emissions indicated by the CEMS must be considered violations of the applicable emission limit for the purpose of this permit." Permit, p. 11, Condition IX.R.4. However, the PM BACT limit is excluded from this condition by Condition IX.R.3.v. It is unclear whether the PM CEMS would be used to identify excess PM emissions, and thus violations of the PM limits. We believe that the PM CEMS should be required to determine continuous compliance with the PM BACT limit and that the Permit should be clarified to so indicate.

We further note that the Draft Permit does not disclose where the PM CEMS would be located. It is common to locate opacity and PM monitors upstream of the wet scrubber to avoid wet stacks. This would overestimate PM emissions because the scrubber removes a substantial amount of PM, up to 90%. Ex. 31.[32] This could lead to future challenges of the data for compliance purposes, if permit limits are exceeded. The DataGuard PM monitor has been demonstrated to yield accurate data in wet stacks and has been successfully used at several coal fired power plants, including Big Bend (since 2/02), Dominion Mt. Storm (since 7/04), WE Energy Oak Creek (since 1/05), Western Kentucky Energy Henderson (since 1/05), and WE Energy, Pleasant Prairie (since 9/06). Ex. 31. Thus, we encourage EPA to specifically require that the PM CEMs be located in the stack, rather than upstream of the wet scrubber.

II.C Excess Emissions

The Draft Permit defines excess emissions in Condition IX.R.3, but fails to indicate what is to be done in response to finding them, beyond filing a written report with the EPA. Permit, p. 1, Condition IV and p. 10, Condition IX.R.3. The Permit should be revised to require that the permittee take immediate steps to reduce emissions below permitted levels. NSR Manual, p. H.10.

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[32] Craig Clapsdale, Particulate Monitoring in Wet Scrubbed Stacks, McIlvaine Hot Topic PM2.5, Slides, November 2, 2006.

II.D Ambiguities Render Permit Unenforceable

Permits that contain vague and ambiguous terms are not enforceable. "Ambiguous language hampers the source in its duty to independently assure compliance, and leaves legal requirements open to interpretation." Letter from Bharat Mathur, EPA Region 5, to Robert F. Hodanbosi, Ohio EPA (Nov. 21, 2000). See also Region 9 Guidelines at III-5 and 61[33] ("It is important that permit conditions be unambiguous and do not contain language which may intentionally or unintentionally prevent enforcement").

II.D.1 Averaging Times

The averaging times for the emission limits in the Draft Permit are ambiguous. All of the limits are expressed as averages over a "3-hour period," a "24-hour period," or a "rolling 365-day period." Permit, pp. 5-6. The latter is clear, but the former are not. The type of averaging intended for the 3-hour period and the 24-hour period is ambiguous. A 3-hour average, for example, could be determined in several ways, each of which would result in a different average. The data could be averaged in 3-hour blocks. The data could be averaged in rolling 3-hours blocks, advancing through time by adding the most recent hour and dropping the latest hour from sequential 3-hour blocks. Or the data for an entire year could be parceled into sequential 3-hour blocks, and these blocks averaged over the year. Thus, the Permit should be revised to clarify the type of average that is required. The BACT limits then need to be revisited to determine if this would result in a lower BACT limit.

Further, the SOB contains a table that summarizes the BACT emission limits for the PC boilers. SOB, p. 30, Table 8. The averaging times specified in this table differ from those required in the Draft Permit for the following:

- VOC (Permit = 24 hr; SOB=3 hr)
- PM (Permit=24 hr; SOB=6 hr)
- PM10 (Permit=24 hr; SOB=6hr)
- H_2SO_4 (Permit=3 hr; SOB=annual)
- HF (Permit=3 hr; SOB=annual)
- Pb (Permit=3 hr; SOB=quarterly)

The revised Permit should resolve these discrepancies in favor of the more stringent (shorter) averaging time. The Draft Permit should be recirculated for public review if the averaging time is relaxed.

[33] U.S. EPA, Title V Permit Review Guidelines: Practical Enforceability, September 9, 1999.

II.D.2 Ambiguous Language

II.D.2.a Condition III

Condition III requires that all equipment, facilities, and systems used to achieve compliance with the Draft Permit must be operated "as intended" to minimize air pollutant emissions. The phrase "as intended" is ambiguous. Further, it appears to conflict with the obligation to operate air pollution control equipment "in a manner consistent with good air pollution control practice for minimizing emissions." 40 CFR 60.11(d).

II.D.2.b Condition IX.N.2

Condition IX.N.2 defines startup to be a period starting with ignition and lasting until "the equipment has reached a continuous operating level and operating permit limits." Permit, p. 7, Condition IX.N.2. The term "the equipment" is ambiguous as it could refer to any piece of equipment at the facility. The startup language applies only to the boiler.

The phrase "continuous operating level AND operating permit limits" requires that both conditions be satisfied simultaneously. This phrase would allow the boiler to operate at a stable rate but exceed its permits limits continuously, a clearly unintended result. The definition should be revised to restrict the length of individual startup and the number of startups. Further, the term "continuous operating level" is not defined and has no known meaning. The term "stable" would be a better choice.

II.D.2.c Condition IX.P.2

The emergency diesel generators are only permitted to operate during certain "emergency conditions." Permit, p. 8, Condition IX.P.2. However, the Permit does not define or explain what conditions constitute "emergency conditions."

II.E Drafting Errors

The Draft Permit contains minor errors that should be corrected. These include:

- The BACT pollutant, fluorides, is referred to as HF (Condition IX.B, p. 3; Condition IX.C.1, p. 3; Condition IX.C.1.vii, p. 4; Condition IX.M, p. 7). Hydrogen fluoride is one compound that falls in the general class of "fluorides," which is the regulated pollutant. The Permit should be amended to replace HF with fluorides

- The reference to Section X in Condition IV (p. 1) should be changed to Condition IX.

- The reference to Condition L.2 in Condition IX.N.1 should be changed to Condition N.2.

- The reference to Condition IX.M in Condition IX.R.3.v, p. 11, should be Condition IX.N (error occurs in two places in this condition).

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We request that EPA not issue the permit until all of the above-described errors have been corrected. Please contact me if you have any questions or concerns.

Sincerely,

Sanjay Narayan
Staff Attorney
Sierra Club Environmental Law Program

Enclosure (via U.S. mail only).

85 Second Street, Second Floor San Francisco, CA 94105-3441 TEL: (415) 977-5500 FAX: (415) 977-5792 www.sierraclub.org